

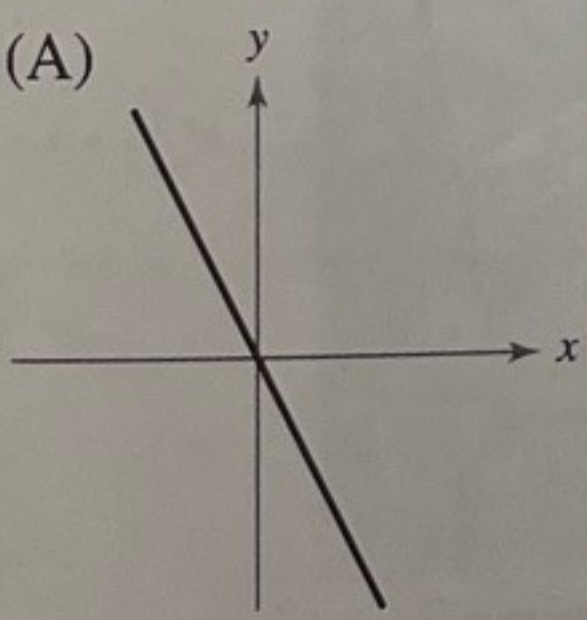
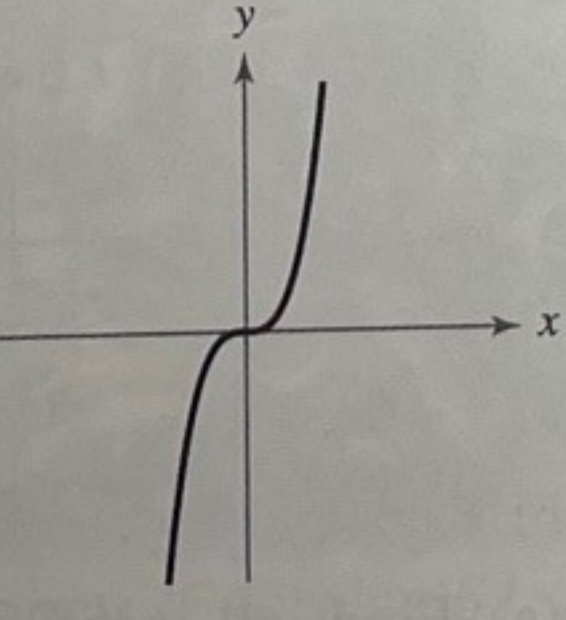
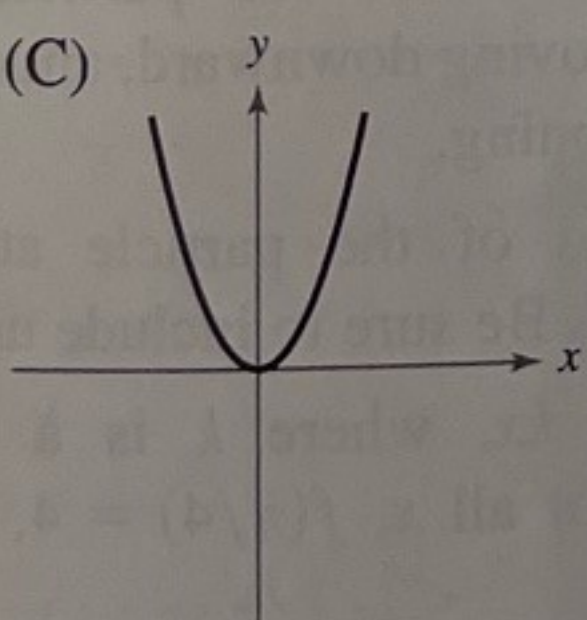
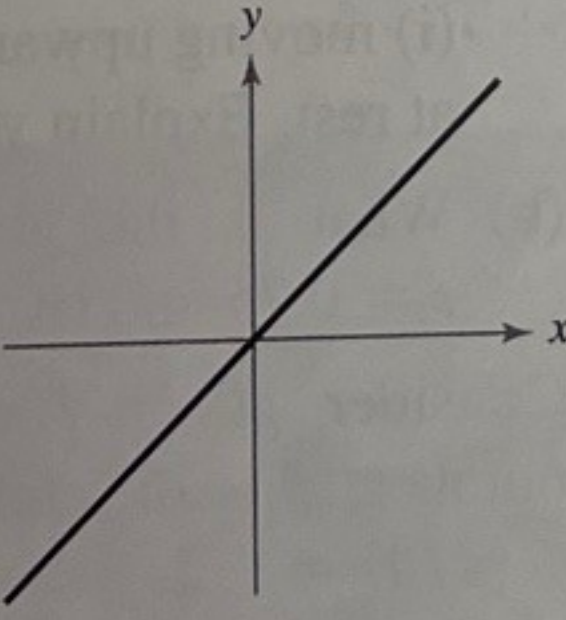
AP<sup>®</sup> Exam Practice QuestionsSee [LarsonCalculus.com](http://LarsonCalculus.com) for worked-out solutions to these questions.

## What You Need to Know

- The definition of the derivative is primarily tested on the multiple-choice section of the AP<sup>®</sup> Exam.
- Some questions on the AP<sup>®</sup> Exam state that a function is differentiable without stating that the function is continuous. You need to recognize that Theorem 2.1 applies in these situations.
- The AP<sup>®</sup> Exam requires that you have proficiency with using a function's equation, table of values, or graph when finding the average velocity or average rate of change.
- Questions on the AP<sup>®</sup> Exam that require the use of the Product, Quotient, or Chain Rule do not typically involve complicated computations. However, be sure you do the more difficult exercises in this chapter because they will help you master and remember these rules.
- Although you should know the derivatives of the six trigonometric functions, the derivatives of the sine, cosine, and tangent functions are the most commonly tested on the AP<sup>®</sup> Exam.
- Related rate problems make frequent appearances on the AP<sup>®</sup> Exam because they represent a powerful application of implicit derivatives.

## Practice Questions

## Section 1, Part A, Multiple Choice, No Technology

- If  $f$  is differentiable at  $x = c$ , which of the following could be false?
  - $f$  is continuous at  $x = c$ .
  - $\lim_{x \rightarrow c} f(x)$  exists.
  - $f'(c)$  is defined.
  - $f''(c)$  is defined.
- Which graph shows a function whose derivative is always negative?
  - 
  - 
  - 
  - 

- If  $y = \frac{6x^4 - 3x^5 + 5x^3}{x^3}$ , then  $\frac{d^2y}{dx^2} =$ 
  - $6 - 6x$ .
  - $6$ .
  - $6x$ .
  - $-6$ .

- Consider the function
 
$$f(x) = \frac{5}{2}\sqrt{x}.$$

The rate of change of  $f$  at  $x = c$  is twice its rate of change at  $x = 3$ . What is the value of  $c$ ?

  - $\frac{1}{2}$
  - $\frac{5\sqrt{3}}{12}$
  - $\frac{3}{4}$
  - $\frac{5\sqrt{3}}{6}$

- If  $h(x) = |2x - 5|$ , which of the following is true?
  - $h$  is continuous but is not differentiable at  $x = \frac{5}{2}$ .
  - $h$  is not continuous but is differentiable at  $x = \frac{5}{2}$ .
  - $h$  is continuous and differentiable at  $x = \frac{5}{2}$ .
  - $h$  is neither continuous nor differentiable at  $x = \frac{5}{2}$ .
- If  $y = \sqrt[4]{8x + 3}$ , then  $y' =$ 
  - $\frac{2}{(8x + 3)^{3/4}}$
  - $\frac{1}{4(8x + 3)^{3/4}}$
  - $\frac{1}{4}(8x + 3)^{3/4}$
  - $\frac{8}{(8x + 3)^{3/4}}$
- Let  $f(x) = \sin x - \cos x$  and let  $f^{(n)}(x)$  represent the  $n$ th derivative of  $f(x)$ . What is the least positive integer  $n$  for which  $f^{(n)}(x) = f(x)$ ?
  - 3
  - 4
  - 5
  - 8